REMARKS

This Amendment and Response to Non-Final Office Action is being submitted in response to the non-final Office Action mailed June 2, 2006. Claims 1-22 are pending in the Application. Claims 1, 5, and 9 are the independent claims.

Claims 17-19 are objected to due to minor informalities.

Claims 1-8, 12-16, and 18-21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

Claims 9-11, 17, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Juniper ("Juniper Networks M40 Internet Backbone Router Inter-Operating With the CIENA MultiWave Sentry DWDM System"), Waschka, Jr. (U.S. Patent No. 4,449,247), and Taga et al. (U.S. Patent No. 5,585,954).

In response to these objections and rejections, the Claims have been amended herein to further clarify the subject matter which Applicants regard as their invention, without prejudice or disclaimer to continued examination on the merits. These amendments are fully supported in the Specification, Drawings, and Claims of the Application and no new matter has been added. Based upon the amendments, reconsideration of the Application is respectfully requested in view of the following remarks.

Objection to the Claims:

Claims 17-19 are objected to due to minor informalities. Specifically, Claims 17-19 begin with language that identifies them as method claims; however, the parent claims are system claims.

In response to this objection, claims 17-19 have been amended such that they correctly correspond to their parent claims.

Therefore, Applicants submit that the objection to Claims 17-19 due to minor informalities has now been overcome and respectfully request that this objection be withdrawn.

Rejection of Claims 1-8, 12-16, and 18-21 Under 35 U.S.C. 112, First Paragraph:

Claims 1-8, 12-16, and 18-21 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

Examiner states that Applicants' most recent prior amendment introduces limitations absent from the original disclosure of Applicants' invention.

The earlier amendments by Applicants have been omitted.

Therefore, Applicants submit that the rejection of Claims 1-8, 12-16, and 18-21 under 35 U.S.C. 112, first paragraph has now been overcome and respectfully request that this rejection be withdrawn.

Rejection of Claims 9-11, 17, and 22 Under 35 U.S.C. 103(a) - Juniper, Waschka, Jr., and Taga et al.:

Claims 9-11, 17, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Juniper ("Juniper Networks M40 Internet Backbone Router Inter-Operating With the CIENA MultiWave Sentry DWDM System"), Waschka, Jr., and Taga et al.

Claim 9 has been amended to recite:

> A system for testing optical communication channels for wavelength division multiplexed optical communication using transmitters and receivers, the transmitters being co-located with each other and the receivers for testing, comprising:
>
> a bit error rate tester to generate a bit error rate test signal, wherein the bit error rate test signal is transmitted over a plurality of optical communication channels ***in a wavelength division multiplexed optical communication system*** arranged in a continuous cascade of a co-located plurality of optical transmitter/receiver pairs;
>
> said tester determining a measured bit error rate, wherein said tester determines whether said measured bit error rate is greater than a predetermined bit error rate threshold for said plurality of optical communication channels; and
>
> a diagnostic analyzer to analyze diagnostic output signals from said transmitters and said receivers and to identify at least one faulty communication channel from said optical transmitter/receiver pairs using a bit parity check because said measured bit error rate is greater than said predetermined bit error rate threshold ***as determined by a performance monitor in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs.***

Similarly, Claim 1 has been amended to recite:

> A method of testing a bit error rate for each of a plurality (N) of optical communication channels, N being greater than 2, in a wavelength division multiplexed optical communication system having N optical transmitters communicating to N optical receivers via N communication channels, the N optical receivers being co-located with each other and with the N optical transmitters for testing, the method comprising:
>
> cascading said N optical communication channels such that an electrical output of an optical receiver i for an optical communication channel i is connected to an input of an optical transmitter i + 1 for an optical communication channel i +

1, for all values of i from one to N-l, so as to form a continuous cascade of a co-located plurality of optical transmitter/receiver pairs;

supplying a bit error rate test signal from a bit error rate tester to an input for a first optical transmitter for a first optical communication channel;

supplying the bit error rate test signal from an output of optical receiver N to the bit error rate tester;

detecting errors in the bit error rate test signal received by the bit error rate tester and calculating therefrom a measured system bit error rate;

comparing the measured system bit error rate with a predetermined system bit error rate threshold;

monitoring a signal quality for the bit error rate test signal at each of the N optical transmitters and N optical receivers ***in the wavelength division multiplexed optical communication system*** when the measured system bit error rate is greater than the predetermined system bit error rate threshold to thereby determine which of the N optical communication channels has an associated bit error rate value that is greater/less than a specified bit error rate value; and

identifying, with a diagnostics analyzer that analyzes a plurality of transmitter diagnostic output signals from each optical transmitter and a plurality of receiver diagnostic output signals from each optical receiver, which of the N optical communication channels has an associated bit error rate value that is greater than a specified bit error rate value, and thus is a faulty communication channel that needs correction, as determined by a performance monitor in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs.

Similarly, Claim 5 has been amended to recite:

A method for performing a bit error rate test for a plurality of optical communication channels of a wavelength division optical communication system having transmitters and receivers, the transmitters being co-located with each other and with the receivers for testing, comprising:

supplying a bit error rate test signal from a bit error rate tester to an input for a first optical transmitter for a first optical communication channel of said plurality of optical communication channels arranged in a continuous cascade of a co-located plurality of transmitter/receiver pairs;

receiving the bit error test signal at the bit error rate tester from a final optical receiver;

detecting a measured bit error rate; and

identifying, ***with a diagnostics analyzer that analyzes a plurality of transmitter diagnostic output signals from each optical transmitter and a plurality of receiver diagnostic output signals from each optical receiver***, at least one faulty communication channel from said plurality of optical communication channels ***in the wavelength division optical communication system*** by performing a bit parity check for each transmitter/receiver pair because the

measured bit error rate is greater than a predetermined system bit error rate threshold, ***as determined by a performance monitor in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs.***

These amendments are fully supported in the Specification, Drawings, and Claims of the Application and no new matter has been added.

As stated by Examiner, Juniper fails to teach or suggest 1) comparing the measured system bit error rate with a predetermined system bit error rate threshold; 2) monitoring a signal quality for the bit error rate test signal at each of the N optical transmitters and N optical receivers when the measured system bit error rate is greater than the predetermined system bit error rate threshold to thereby determine which of the N optical communication channels has an associated bit error rate value that is greater/less than a specified bit error rate value; 3) a diagnostic analyzer to analyze diagnostic output signals from said transmitters and said receivers and to identify at least one faulty communication channel from said optical transmitter/receiver pairs using a bit parity check because said measured bit error rate is greater than said predetermined bit error rate threshold; or 4) internal performance monitors in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs.

In regard to 1) comparing the measured system bit error rate with a predetermined system bit error rate threshold, which, as Examiner has noted in not taught or suggested in Juniper but would be obvious to one of ordinary skill in the art at the time the invention was made to include the teachings of Waschka, Jr., Applicants respectfully disagree. Waschka, Jr. merely teaches "transmitting a test signal . . . ," (col. 30, line 62); "monitoring . . . said test signal as test signal is looped back from said first selected communication channel and received over said second communication channel," (col. 30, lines 65-69) and "monitoring that the quality of said test signal is less than a prescribed level . . ." (col. 31, lines 3-4). Applicants note that Waschka, Jr. does not teach BER testing in a WDM system, and that each optical communication channel comprises two fiber links (see col. 1, lines 30-35.) Thus, Waschka, Jr. do not teach or suggest

using BER testing in a WDM system with greater than two optical communication channels, wherein the optical communication channels are cascaded in a chain.

Applicants, however, have disclosed a BER comparison step for use in a WDM system, wherein there are greater than two optical communications channels, and wherein the said channels are cascaded. Additionally, the system BER is used ultimately to determine which, if any, of the plurality of optical channels in a fiber in a WDM system are faulty. This also differs from Waschka, Jr., wherein the test signal on an optical communicaion channel (on two fiber links, see col. 1, lines 30-35) is measured against a prescribed level to ultimately use for isolation of a regeneration station, or the like, along a fiber link. Thus, it would not have been obvious to one of ordinary skill in the art at the time the invention was made to include the teachings of Waschka, Jr. with Juniper.

In regard to 2) monitoring a signal quality for the bit error rate test signal at each of the N optical transmitters and N optical receivers when the measured system bit error rate is greater than the predetermined system bit error rate threshold to thereby determine which of the N optical communication channels has an associated bit error rate value that is greater/less than a specified bit error rate value, which, as Examiner has noted in not taught or suggested in Juniper but would be obvious to one of ordinary skill in the art at the time the invention was made to include the teachings of Waschka, Jr., Applicants respectfully disagree.

Waschka, Jr. merely teaches a fault location technique to determine which station along a fiber link is faulty, in which an "***operator selectively interrogates*** ***the data/voice control units in the stations along the link***, using the alarm interrogate unit . . . in order to cause the BER test logic of the addressed station to provide a BER indication on the basis of the test sequence. In this manner, ***the location of the fault may be isolated by sequential testing*** ***of the stations along the channel.***" (Emphasis added). In other words Waschka, Jr. teaches a system in which an operator must selectively interrogate units along a fiber link and in which sequential testing is required. There are no such requirements in the present invention for monitoring and determining which optical communication channels in a WDM system may be faulty. Rather, the present invention identifies, with a diagnostics analyzer that analyzes a plurality of

transmitter diagnostic output signals from each optical transmitter and a plurality of receiver diagnostic output signals from each optical receiver, which of the N optical communication channels has an associated bit error rate value that is greater than a specified bit error rate value, and thus is a faulty communication channel that needs correction, as determined by a performance monitor in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs. Thus, it would not have been obvious to one of ordinary skill in the art at the time the invention was made to include the teachings of Waschka, Jr. with Juniper, nor would it be logical to include the teachings of Waschka, Jr. requiring an operator, selective interrogations on stations along a fiber link, and sequential testing of the stations along the channel.

In regard to 3) a diagnostic analyzer to analyze diagnostic output signals from said transmitters and said receivers and to identify at least one faulty communication channel from said optical transmitter/receiver pairs using a bit parity check because said measured bit error rate is greater than said predetermined bit error rate threshold , which, as Examiner has noted in not taught or suggested in Juniper but would be obvious to one of ordinary skill in the art at the time the invention was made to include the teachings of Waschka, Jr., Applicants respectfully disagree.

Examiner specifically states that a diagnostics analyzer is taught by Waschka, Jr. at Col. 31, lines 3-4. However, earlier, Examiner used that exact same reference location in Waschka, Jr. equating it to a BER test device for the purposes of measuring and comparing a BER system measurement. The BER tester and the diagnostics analyzer of the present invention are not one in the same. The BER tester is comprised of a BER test signal generator and a BER detector. While the BER tester is working and where the measured system BER for the WDM optical communication system exceeds the predetermined BER threshold for any of the communication channels, a diagnostics analyzer is used to analyze the transmitter output signals of the optical transmitters and the receiver output diagnostic output signals of the optical receivers in the WDM communication system. At that point, the diagnostics analyzer identifies which optical communicaion channel(s) are faulty by determining where excessive bit errors were detected by the on-board diagnostics circuits (performance monitors) on each of the optical transmitters and

optical receivers in the cascaded chain of optical communication channels and communicated to the diagnostics analyzer. By use of not only a BER tester, but also a diagnostics analyzer, the optical communication channel(s) which are not within specification are identified so that corrective measures may be taken. This is not taught or suggested by Waschka, Jr. nor would the fault location teachings of Waschka Jr., as discussed above, be suitable for inclusion in Juniper. Additionally, the alarm interrogation units of Waschka, Jr. are used as part of an operator's selective interrogation of data/voice units (see Col. 19, lines 35-40) and are not the results of internal performance monitors in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs providing data to a diagnostics analyzer.

In regard to 4) internal performance monitors in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs, which, as Examiner has noted in not taught or suggested in Juniper but would be obvious to one of ordinary skill in the art at the time the invention was made to include the teachings of Waschka, Jr., Applicants respectfully disagree.

Applicants note that while Waschka, Jr. does teach BER test logic at a station along a fiber link (col. 30-33) that is accessed only after an operator patches into the station's BER test logic by a BER tester, and wherein the test logic of each respective station "can be selectively addressed to isolate the location of the cause of the BER degradation." (Col. 19, lines 31-35), there is no on-board diagnostics circuit (performance monitor) that is actively monitoring BER on each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs providing data to a diagnostics analyzer. Thus, it would not have been obvious to one of ordinary skill in the art at the time the invention was made to include the teachings of Waschka, Jr. with Juniper.

Thus, Juniper fails to teach or suggest 1) comparing the measured system bit error rate with a predetermined system bit error rate threshold; 2) monitoring a signal quality for the bit error rate test signal at each of the N optical transmitters and N optical receivers when the measured system bit error rate is greater than the predetermined system bit error rate threshold to

thereby determine which of the N optical communication channels has an associated bit error rate value that is greater/less than a specified bit error rate value; 3) a diagnostic analyzer to analyze diagnostic output signals from said transmitters and said receivers and to identify at least one faulty communication channel from said optical transmitter/receiver pairs using a bit parity check because said measured bit error rate is greater than said predetermined bit error rate threshold; or 4) internal performance monitors in each of the optical transmitters and each of the optical receivers in the continuous cascade of a co-located plurality of optical transmitter/receiver pairs, and these deficiencies are not remedied by Waschka, Jr., Bullock et al., or Taga et al.

Therefore, Applicant submits that the rejection of Claims 9-11, 17, and 22 under 35 U.S.C. 103(a) as being unpatentable over Juniper ("Juniper Networks M40 Internet Backbone Router Inter-Operating With the CIENA MultiWave Sentry DWDM System"), Waschka, Jr., and Taga et al. has now been overcome and respectfully requests that this rejection be withdrawn.

CONCLUSION

Applicants would like to thank Examiner for the attention and consideration accorded the present Application. Should Examiner determine that any further action is necessary to place the Application in condition for allowance, Examiner is encouraged to contact undersigned Counsel at the telephone number, facsimile number, address, or email address provided below. It is not believed that any fees for additional claims, extensions of time, or the like are required beyond those that may otherwise be indicated in the documents accompanying this paper. However, if such additional fees are required, Examiner is encouraged to notify undersigned Counsel at Examiner's earliest convenience.

Respectfully submitted,

Date: August 31, 2006

Christopher L. Bernard
Registration No.: 48,234
Bradley D. Crose
Registration No.: 56,766
Attorneys for Applicants

DOUGHERTY | CLEMENTS
1901 Roxborough Road, Suite 300
Charlotte, North Carolina 28211 USA
Telephone: 704.366.6642
Facsimile: 704.366.9744
cbernard@worldpatents.com